REMARKS

The present invention is directed to the lubrication of gas engines using gas engine oils which exhibit enhanced life, as evidenced by a reduction in viscosity increase, oxidation increase, nitration increase, TAN increase and TBN depletion, said gas engine oil comprising a base oil having a viscosity at 100°C between 9 to 13 cSt, about 0.1 to 2 vol% phenolic anti oxidant, about 0.2 to about 0.5 vol% anti-wear additive and an amount of viscosity index improver which is not sufficient to produce a multi grade gas engine oil lubricating composition, the amount of viscosity index improver being in the range of about 0.1 to 3 vol%, and a minor amount of low ash gas engine oil detergent system having a TBN of about 50 to about 300, wherein the gas engine oil has a low ash content in the range of 0.1 to 0.6 wt% and wherein the enhancement of the life of the gas engine oil is in comparison to single grade gas engine oils which do not contain phenolic anti-oxidant(s) and viscosity index improver(s).

The Examiner rejects claim 1 and those claims dependent thereon under 35 U.S.C. § 112, second paragraph, as being indefinite and unclear in that the base oil and the engine oil may both possess a viscosity of 13 cSt at 100°C, the claim language "about 13.2 cSt at 100°C" as used for the engine oil reading on the 13 cSt @ 100°C viscosity of the base oil.

Composition claim 1 and those claims dependent thereon have been cancelled, thus rendering this rejection moot.

The Examiner rejected all the claims 1, 4-6 and 9-14 (both composition and method claims) under 35 U.S.C. § 103(a) as unpatentable over Blahey (USP 5,726,133).

The Examiner argued that Blahey teaches a low ash gas engine oil and additive system comprising a lubricating oil base stock, KV @ 100°C of about 5 to 16 cSt, a minor amount of a detergent comprising a mixture of a low TBN alkali or alkaline earth metal salt and at least one more neutral alkali or alkaline earth metal salt, a viscosity

index improver and an anti oxidant (abstract, column 2, lines 1-11, 25-27). Anti oxidant can be present in an amount from 0.05 to 1.5 vol%, anti oxidants can be phenolic, aminic or mixtures thereof (column 4, lines 27-35). Viscosity index improvers can be present in amount up to 15 vol% (column 4, lines 58-67), as well as an anti wear agent in an amount from about 0.05 to 1.5 vol% (column 4, lines 42-48).

The Examiner acknowledges that Blahey '133 differs from the present claims in that it does not specifically teach that the base stock does not contain an oil having a viscosity @ 100 °C of 20 cSt or higher, but she concludes that the omission of a component and its function from a combination is an obvious expedient of the remaining components perform the same function.

Applicants respectfully traverse this first grounds of rejection under 35 U.S.C. § 103(a).

Composition claim 1 and all claims dependent thereon have been cancelled.

Method claim 6 has been amended to make it clear that the present method is directed to the lubrication of a gas engine using a particularly described lubricating oil, one which does not contain any aminic anti oxidant, but which does contain as anti-oxidant only phenolic anti oxidant, which contains an amount of viscosity index improver which is not sufficient to render the oil multi grade, the amount of viscosity index improvers ranging from about 0.1 to 3 vol%, the gas engine oil lubricant composition being used to thus lubricate the gas engine being an enhanced life gas engine oil as evidenced by a reduction in at least one of viscosity increase, oxidation increase, nitration increase, TAN increase and TBN depletion as compared to gas engine oils which do not contain both phenolic anti-oxidant(s) and viscosity index improver(s).

The limitation that the base stock does not contain any base oil having a viscosity at 100°C of 20 cSt or higher has been deleted from claim 6 as being unnecessary.

Rather, it is pointed out that the significant and patentable difference between the present invention and Blahey '133 is not the presence or absence of 20 cSt base stock, but the presence of both phenolic anti oxidant and viscosity index improver so as to lubricate a gas engine using an oil which exhibits enhanced life as evidence by a reduction in at least one of viscosity increase, oxidation increase, nitration increase, TAN increase and TBN depletion as compared against gas engine oils which do not contain both phenolic antioxidant(s) and viscosity index improver(s).

Claim 6 has been amended to reflect the above arguments based on and supported by the evidence and showing of Table 1, Oil 11 and Oil 13 vs. all other oils presented in that Table.

Oils 11 and 13 both contain phenolic antioxidants and viscosity index improvers. Both of those oils either meet or surpass the performance of Oil 10 (which only contains phenolic antioxidant) in all measured categories.

Oils 11 and 13 surpass Oil 12 (which only contains aminic antioxidants) in all measured categories.

Oils 11 and 13 surpass Oils 1 and 2 (which contain only aminic antioxidants in terms of TAN Δ (increase) and TBN depletion.

Oils 11 and 13 surpass Oil 3 (which only contains a phenolic antioxidant) in terms of nitration, TAN Δ (increase) and meet Oil 3's performance in TBN depletion.

Oils 11 and 13 surpass Oil 4 (which contains a mixture of phenolic and aminic antioxidants) in terms of nitration and TBN depletion.

Oils 11 and 13 surpass Oil 5 (which contains the same phenolic and aminic antioxidant mixture as Oil 4 but at a higher treat rate) in terms of nitration and TBN depletion.

Oils 11 and 13 surpass Oil 6 (which contains only phenolic and aminic antioxidant mixture) in terms of nitration, TAN Δ increase and TBN depletion.

Oils 11 and 13 surpass Oil 7 (which contains the same phenolic and aminic antioxidant mixture as Oil 6 but at a higher treat rate) in terms of nitration, TAN Δ increase, and TBN depletion.

Oils 11 and 13 surpass Oil 8 (which only contains a phenolic antioxidant) in terms of nitration.

Oils 11 and 13 surpass Oil 9 (which only contains the phenolic antioxidant of Oil 8 but at a higher treat rate) in terms of nitration.

It must be noted that Oils 1-10 all contained heavy base stock (1200N base oil, about 20 cSt) as thickeners to bring the formulation viscosity up to about 13.2 cSt at 100°C.

Oil 12 substituted a viscosity index improver for heavy base oil but in combination with only an aminic antioxidant.

By comparison Oils 11 and 13 which use viscosity index improvers to raise the formulation viscosity to a target viscosity of about 13.2 cSt @ 100°C in combination with phenolic antioxidant, not only raised the formulation viscosity but unexpectedly also improved one or more indicia of engine oil life, that is, reduced one or more of viscosity increase, oxidation increase, nitration increase, TAN increase and TBN depletion.

Nothing in Blahey '133 taught, suggested or implied that in lubricating a gas engine using a gas engine oil containing a base oil and both a phenolic antioxidant and a viscosity index improver and omitting an aminic antioxidant the gas engine oil would be of further enhanced life as evidenced by reduction in one or more of viscosity increase, oxidation increase, nitration increase, TAN increase and TBN depletion as

compared against gas engine oils which do not contain both phenolic antioxidants and viscosity index improvers.

Blahey '133 may have suggested a gas engine oil containing a base stock, any anti oxidant (either or both phenolic and aminic) and viscosity index improver in an amount sufficient to produce a multi-grade oil, but it presented no examples of an oil containing both phenolic anti oxidant and viscosity index improver in an amount which does not produce a multi-grade oil and Blahey '133 therefore could not and did not teach that a gas engine oil containing both phenolic anti-oxidant and viscosity index improver in an amount which does not produce a multi grade oil would result in an improvement (reduction) in at least one of the indications of gas engine oil life as compared to gas engine oils which do not contain both phenolic antioxidant and viscosity index improver.

While the teaching of Blahey '133 might be enough to challenge composition claims, which is not herein being acknowledged, the teaching of Blahey '133 is not sufficient to challenge or render obvious the present method claims.

The claim (claim 6) as amended does not merely indicate that the gas engine is lubricated using an oil of enhanced life, but that, even as compared against Blahey '133, a particular combination of components results in a degree of enhancement not taught, suggested or implied in Blahey '133.

Blahey '133, in reciting that the antioxidant can be phenolic, aminic or both draws no distinction between the two types, leading one of ordinary skill in the art to equate their performance.

Blahey '133 recites that viscosity index improvers can be used to produce a multigrade engine oil but does not teach, suggest or imply that if only enough viscosity index improver was used, which does not result in a multi grade engine oil, in combination with phenolic antioxidant (Oils 11 and 13) and not aminic antioxidant (Oil

12) the resulting formulation would exhibit yet a higher degree of enhanced life as evidenced by reduction in one or more of viscosity increase, oxidation increase, nitration increase, TAN increase and TBN decrease as compared to gas engine oils which do not contain both phenolic antioxidant and viscosity index improver. That such an interaction exists between phenolic antioxidant and viscosity index improver is not taught, suggested or implied by Blahey '133.

The Examiner rejects the claims over Blahey '133 arguing that while Blahey '133 does not specifically teach that the viscosity of the engine oil is increased to about 13.2 cSt at 100°C, a case of prima facie obviousness exits where the claimed ranges and the prior art do not overlay but are close enough that one skilled in the art would have expected them to have the same properties. The claimed language "about 13.2 cSt" reads on the 13.5 cSt viscosity in Blahey '133.

Claim 1, which recited a viscosity of "about 13.2 cSt" has been cancelled. Amended claim 6 did not and does not recite raising the viscosity to "about 13.2 cSt at 100°C" and does not rely on this as a point of distinction.

The Examiner rejects the claims (1, 4-6, 9, 10, 12 and 14, embracing both composition and method claims) under 35 U.S.C. § 103(a) as obvious over Inoue (USP 5,744,430.

The Examiner argues that Inoue teaches an engine oil composition which has a lower viscosity and a long lifetime (column 1, lines 25-41). The composition comprises a base oil having a KV at 100°C of 2 to 8 mm^2/s (cSt) and is a synthetic or solvent refined mineral oil or mixture thereof, a phenolic ashless antioxidant (0.1 to 3 wt%) a viscosity index improver (1-10 wt%), an alkaline earth metal salicylate detergent (TBN 60-350), antiwear agents (0.1 to 15 wt%).

The Examiner acknowledges that Inoue fails to teach that the base oil possesses a kinematic viscosity between 9 to 13 cSt but that a case of prima facie obviousness exists

where the claimed ranges and the prior art do not overlap but are close enough that one skilled in the art would have expected them to have the same properties. The claimed KV of a 9 cSt is close enough to the KV of Inoue (8 cSt) that one skilled in the art would expect the oils would have the same properties.

Applicants respectfully traverse this rejection.

In the present application, composition claims 1, 4, 11 and 12 have been cancelled.

In regard to the method claims (claim 6 and those claims dependent thereon), they have been amended to recite that the method is the lubrication of a gas engine.

Inoue by comparison teaches a lighter lubricating formulation suitable for gasoline powered engines and not gas engines.

Inoue's formulations have "long life" in terms of friction modification and reduced friction. In the passage highlighted by the Examiner (column 1, lines 25-41), a complete reading reveals that long life is identified in regard to the friction reducing properties of the engine oil. Reference to the Examples of Inoue, while acknowledged as not being a limiting factor, does still only show that it is the friction reducing potential of the oil which is being considered in terms of oil performance and "oil life". The oils were evaluated in a SRV reciprocating dynamic friction tester. It is the ability of the oil to maintain low friction fractors after deterioration which is being evaluated.

Therefore, Inoue's statement that the oil is of "long life" is directed to an entirely different measure of oil life.

Just because Inoue demonstrates that his light oil has long low friction factor life does not teach, suggest or imply that a heavier version would or could function as a useful gas engine oil or exhibit enhanced life in a gas engine oil environment as evidenced by a reduction in one or more of viscosity increase, oxidation increase,

nitration increase, TAN Δ increase and TBN decrease as compared against gas engine oils which do not contain both phenolic antioxidant and viscosity index improvers, the amount of viscosity index improvers used being not sufficient to produce a multi grade oil.

Nothing in Inoue teaches, suggests or implies a method for lubricating a gas engine or using as the gas engine oil a material comprising a base oil having a KV at 100°C of from 9-13 cSt, from about 0.1 to 2 vol% phenol antioxidant, an amount of viscosity index improver which is not sufficient to produce a multi-grade gas engine oil, the amount being in the range of about 0.1 to 3 vol% an amount of gas engine oil detergent having a TBN of about 50 to about 300 wherein the gas engine oil has a low ash content in the range of 0.1 to 0.6 wt% and wherein the gas engine oil exhibits an enhanced life as evidenced by a reduction of one or more of viscosity increase, oxidation increase, nitration increase, TAN increase and TBN decrease as compared to gas engine oils which do not contain both phenoic antioxidant and viscosity index improver in that amount specified.

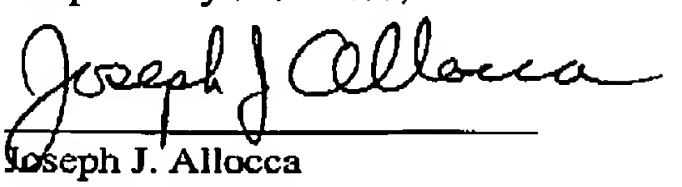
Support can be found in the specification at page 15, second paragraph, for the amendatory claim language that the viscosity index improver is used in an amount which is not sufficient to produce a multi grade product.

Support can be found in the specification in the Examples of Table 1 that enhanced life is evidenced by the reduction of at least one of the indices of gas engine oil life, that is a reduction of at least one of viscosity increase, oxidation increase, nitration increase, TAN increase and TBN decrease and that this enhancement is (unexpectedly) beyond and superior to that exhibited by gas engine oils which do not contain both phenolic antioxidants and viscosity index improvers.

It is requested that the Examiner reconsiders this application in terms of the amendments made to the claims and the above remarks, that she withdraw the

rejections, allow the claims as presently amended and pass the case to issue in due course.

Respectfully submitted,



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